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INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 62988	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP 03/51068	International filing date (day/month/year) 18.12.2003	Priority date (day/month/year) 19.12.2002
International Patent Classification (IPC) or both national classification and IPC G02B5/28		
Applicant THALES UK PLC		

<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 18 sheets.</p>
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the opinion II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application

Date of submission of the demand 02.07.2004	Date of completion of this report 07.01.2005
Name and mailing address of the International preliminary examining authority: European Patent Office - Gitschner Str. 103 D-10958 Berlin Tel. +49 30 25901 - 0 Fax: +49 30 25901 - 840	Authorized Officer Luck, W Telephone No. +49 30 25901-613



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP 03/51068

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-3, 5, 6, 8-17, 20-36 as originally filed
4, 4bis, 7, 7bis, 18, 19, 19bis received on 09.12.2004 with letter of 07.12.2004

Claims, Numbers

1-33 received on 09.12.2004 with letter of 07.12.2004

Drawings, Sheets

1/4-4/4 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- the description, pages:
- the claims, Nos.:
- the drawings, sheets:

**INTERNATIONAL PRELIMINARY
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International application No. PCT/EP 03/51068

5. This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).
(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-33
	No: Claims	
Inventive step (IS)	Yes: Claims	1-33
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-33
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

The documents cited in the International Search Report are labelled as follows:

D1: US-A-6 107 564 (AGUILERA JOHN A ET AL) 22 August 2000 (2000-08-22)
D2: US-A-3 247 392 (THELEN ALFRED J) 19 April 1966 (1966-04-19)
D3: US-A-3 914 023 (THELEN ALFRED) 21 October 1975 (1975-10-21)
D4: US-A-3 423 147 (THELEN ALFRED J) 21 January 1969 (1969-01-21)
D5: EP-A-0 632 507 (OPTICAL COATING LABORATORY INC) 4 January 1995 (1995-01-04)
D6: EP-A-0 567 735 (GUARDIAN INDUSTRIES) 3 November 1993 (1993-11-03)

The document D1 is regarded as being the closest prior art to the subject-matter of claim 1, and shows

- an optical filter (D1, col. 6, l. 32 "multilayer bandpass filter")
- including a substrate (col. 6, l. 33 "substrate", fig. 7, "CMX GLASS")
- having a plurality of layers of materials (layers 30, 31 and 32 in fig. 7) stacked upon it,
- each of which materials is formed from one or both of: a first material (hafnia) having a first index of refraction (2.1 at 500nm) ; and a second material (silica) having a second index of refraction (1.460 at 500nm) being less than the first index of refraction;
- wherein the plurality of layers of materials include a first layer (30) and a second layer (32) each formed from an inhomogeneous mixture (a mixture will never be perfectly homogeneous, especially if it is produced by a sputtering device of the type used according to D1) of said first material

(hafnia) and said second material (silica); and

- a third layer (31) formed from the first material (hafnia) being stacked in between the first layer and the second layer;
- wherein the optical thickness of each of said first and said second layers (the figures given in fig. 7 result in optical thicknesses of 168.8nm and 167.1nm at 500nm) is greater than the optical thickness of said third layer (22.5 nm).

For the application in solar cells of claim 18 see D1, col. 1, l. 4-21.

The subject-matter of claim 1 and of the method claim 18 essentially differs from this known optical filter in that

the first and second layers have a thickness of about half of the design wavelength and in that refractive index in the intermediate layers increases from the low n to the high n layers whereas in D1 constant refractive index intermediate layers are suggested (for example D1, col. 7, l. 65). Therefore novelty is acknowledged (Article 33(2) PCT).

The problem to be solved is regarded as to further suppressing transients in the passband. The prior art on file does not hint at the claimed solution. Note that the transition zones disclosed by D1, col. 9, l. 65 - col. 10, l. 7 would be much thinner than the claimed half wavelength and would not be modified to the claimed structure since they are suggested for another reason (avoid delamination) in D1. Therefore the subject matter of claims 1 and 18 is considered as involving an inventive step (Article 33(3) PCT).

Claims 2 - 14 and 19 - 33 are dependent on claims 1 respectively 18 and as such also meet the requirements of the PCT with respect to novelty and inventive step. Claims 15 - 17 meet the requirements of the PCT with respect to novelty and inventive step in so far as they are limited to the filter of claim 1.